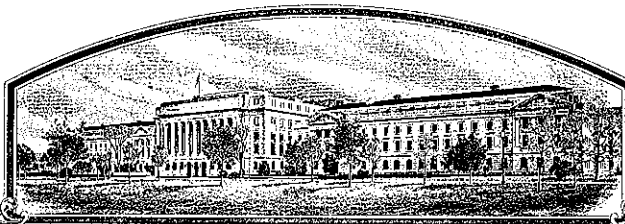


No.

9600081



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**Busch Agricultural Resources, Inc.**

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE FOREGOING PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (34 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'B4311'

*In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this thirtieth day of April in the year of our Lord one thousand nine hundred and ninety-six.*

Attest:

*Marsha A. Henson*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Samuel J. Henson*  
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
SCIENCE DIVISION - PLANT VARIETY PROTECTION OFFICE

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a).

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

## APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate) <b>BUSCH AGRICULTURAL RESOURCES, INC.</b>		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER <b>2B89-4311</b>	3. VARIETY NAME <b>'B4311'</b> <i>per letter mail 4/16/96</i>
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) <b>3515 EAST COUNTY ROAD 52 FT. COLLINS, CO 80524 U.S.A.</b>		5. TELEPHONE (include area code) <b>(970) 221-5622</b>	<b>FOR OFFICIAL USE ONLY</b> PVPO NUMBER <b>9600081</b> DATE <i>Dec. 13, 1995</i> FILING AND EXAMINATION FEE <i>2450.00</i> DATE <i>Dec. 13, 1995</i> CERTIFICATION FEE <i>300.00</i> DATE <i>3-20-96</i>
		6. FAX (include area code) <b>(970) 482-5965</b>	
7. GENUS AND SPECIES NAME <b>HORDEUM VULGARE L.</b>	8. FAMILY NAME (Botanical) <b>GRAMINEA</b>		
9. CROP KIND NAME (Common name) <b>SPRING BARLEY</b>			
10. IF THE APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) (Common name) <b>CORPORATION</b>			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION <b>DELAWARE</b>	12. DATE OF INCORPORATION <b>01/01/81</b>		
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS <b>DR. LES WRIGHT BUSCH AGRICULTURAL RESOURCES, INC. 3515 EAST COUNTY ROAD 52 FT. COLLINS, CO 80524</b>			14. TELEPHONE (include area code) <b>(970) 221-5622</b>
			15. FAX (include area code) <b>(970) 482-5965</b> <i>T.M. 12/12/95</i>
16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)			
a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of the Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Applicant's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,600 viable untreated seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in a public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,450), made payable to "Treasurer of the United States" (Mail to PVPO)			
H. <b>QUALITY AND AGRONOMIC DATA</b> 17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act?) <input type="checkbox"/> YES (If "yes," answer items 18 and 19 below) <input checked="" type="checkbox"/> NO (If "no," go to item 20)			
18. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? <input type="checkbox"/> YES <input type="checkbox"/> NO		19. IF "YES" TO ITEM 18, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED	
20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES? <input type="checkbox"/> YES (If "yes," give names of countries and dates) <input checked="" type="checkbox"/> NO			
21. The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.			
The undersigned applicant(s) is(are) the owner(s) of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.			
Applicant(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.			
SIGNATURE OF APPLICANT (Owner(s)) <i>Mike Bjorko</i>		SIGNATURE OF APPLICANT (Owner(s)) <i>Leslie J. Wright</i>	
NAME (Please print or type) <b>Mike Bjorko</b>		NAME (Please print or type) <b>Leslie J. Wright</b>	
CAPACITY OR TITLE <b>Barley Breeder</b>	DATE <b>11 Dec '95</b>	CAPACITY OR TITLE <b>Research Director</b>	DATE <b>12/11/95</b>

## EXHIBIT A

ORIGIN AND BREEDING HISTORY OF ~~2B89-4311~~ 'B4311'*per letter  
MAH 4/16/96*

PEDIGREE: Harrington/Ellice

DATE OF CROSS: 1986

HISTORY: The selection 2B89-4311 originated in Berthoud, CO as an F4 headrow. It was first tested in replicated yield trials in 1989 at Berthoud, Colorado and Rexburg, ID. It was entered in the Western Spring Barley Nursery in 1994. It has been tested at the Pilot Scale level since 1991 within Anheuser-Busch. It is targeted as a two-rowed malting barley for the Intermountain states. In 1990, head selections were made at Berthoud, Colorado to initiate purification and multiplication. Head-rows were grown and bulked for Breeder seed in 1991. Breeder seed was produced in 1995 at Ft. Collins, Colorado. Certified seed for 2B89-4311 will be available in the spring of 1998.

## AMENDMENT TO EXHIBIT A

FOR PV Application No. 9600081 ~~2B89-4311~~ 'B4311'per letter  
4/16/96 MAH

2B89-4311 is uniform in appearance and stable over eight years and eight generations. Less than .5% of the plants were rogued from Breeder fields in 1995. Approximately 95% of the rogued variant plants were 2-4 centimeters taller than 2B89-4311. Less than .5% total variant plants may be encountered in subsequent generations.

## Selection Criteria :

Intermountain Two-rowed Barley: 2B89-4311

Yield:	Greater than B1202
Maturity:	Equal to or earlier than B1202
Straw strength:	Equal to or greater than B1202
Kernel plumpness:	Equal to or greater than B1202
Protein:	Equal to or less than Harrington
Diastatic power:	Equal to or greater than Harrington
Extract:	Equal to or greater than Harrington
Alpha amylase:	Equal to Harrington
Viscosity:	Equal to or less than Harrington
Turbidity:	Equal to or less than Harrington

## EXHIBIT B

## STATEMENT OF DISTINCTNESS

*per letter  
1/16/96 maw*  
'B4311'

~~2B89-4311~~ is most similar to the spring barley variety "B1215", however it can be distinguished by the following morphological characteristics.

- 2B89-4311 has an erect juvenile growth habit.  
B1215 has a semi-prostrate juvenile growth habit.
- 2B89-4311 has a sharkskin appearance on the kernel lemma.  
B1215 Does not exhibit a sharkskin appearance on the kernel lemma.

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
LIVESTOCK AND SEED DIVISION  
BELTSVILLE, MARYLAND 20705

EXHIBIT C  
(Barley)

OBJECTIVE DESCRIPTION OF VARIETY  
BARLEY (*HORDEUM VULGARE*)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S)

BUSCH AGRICULTURAL RESOURCES, INC.

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

3515 EAST COUNTY ROAD 52  
FT. COLLINS, CO 80524

FOR OFFICIAL USE ONLY

PVPO NUMBER

9600081

VARIETY NAME OR TEMPORARY  
DESIGNATION

2B89-4311 'B4311'

Place the appropriate number that describes the varietal character of this variety in the boxes below.  
Place a zero in first box (i.e.    or   ) when number is either 99 or less or 9 or less.

1. GROWTH HABIT:

1 = SPRING 2 = FACULTATIVE WINTER 3 = WINTER  Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE 3 = ERECT

2. MATURITY (50% Flowering):

1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier)

No. of days Earlier than .....  } 1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON  
 No. of days Later than .....  } 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8 = B1202

3. PLANT HEIGHT (From soil level to top of head):

1 = SEMIDWARF 2 = SHORT (California Mariout) 3 = MEDIUM TALL (Betzes) 4 = TALL (Conquest)

Cm. Shorter than .....  } 1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON  
  Cm. Taller than .....  } 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8 = B1202

4. STEM:

Exertion (Flag to spike at maturity): 1 = 0-3 cm. 2 = 3-10 cm.  Anthocyanin: 1 = ABSENT 2 = PRESENT  
3 = 10-15 cm.

NO. OF NODES (Originating from node above ground)

Collar Shape: 1 = CLOSED 2 = V-SHAPED 3 = OPEN  Shape of Neck: 1 = STRAIGHT 2 = SNAKY  
4 = MODIFIED CLOSED OR OPEN 3 = OTHER (Specify) .

5. LEAF:

Basal leaf sheath (seedling): 1 = GLABROUS 2 = PUBESCENT  Position of flag leaf (at boot stage): 1 = DROOPING 2 = UPRIGHT

Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY   MM. WIDTH (First leaf below flag leaf)

CM. LENGTH (First leaf below flag leaf)  Anthocyanin in leaf sheath: 1 = ABSENT 2 = PRESENT

6. HEAD:

Type: 1 = TWO-ROWED 2 = SIX-ROWED  Density: 1 = LAX 2 = ERECT (Not dense) 3 = ERECT (Dense) 4 = (MID-LAX)

Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE  Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY  
4 = OTHER (Specify)

Lateral Kernels Overlap: 1 = NONE 2 = AT TIP  Rachis (Hair on edge): 1 = LACKING 2 = FEW 3 = COVERED  
3 = 1/4 - 1/2 OF HEAD

7. GLUME:

Length: 1 = 1/3 OF LEMMA 2 = 1/2 OF LEMMA  Hairs: 1 = NONE 2 = SHORT 3 = LONG  
3 = MORE THAN 1/2 OF LEMMA

Hair covering: 1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED

Awns: 1 = LESS THAN EQUAL TO LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES  
3 = MORE THAN EQUAL TO LENGTH OF GLUMES

Awn Surface: 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

## 8. LEMMA:

- ☐ 5 Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS AWNLESS ON LATERAL ROWS  
3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike)  
5 = LONG (longer than spike) 6 = HOODED
- ☐ 4 Awn Surface: 1 = AWNLESS 2 = SMOOTH 3 = SEMISMOOTH 4 = ROUGH
- ☐ 4 Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS 4 = SEVERAL ☐ 1 Hair: 1 = ABSENT 2 = PRESENT
- ☐ 1 Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE 3 = TRANSVERSE CREASE ☐ 2 Rachilla Hairs: 1 = SHORT 2 = LONG

## 9. STIGMA:

- ☒ 2 Hairs: 1 = FEW 2 = MANY 3 = WAITING FOR READING

## 10. SEED:

- ☐ 2 Type: 1 = NAKED 2 = COVERED ☐ 1 Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT
- ☐ 4 Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.)  
4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)
- ☐ 3 Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED
- ☐ 1 Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE
- ☐ 0 ☐ 0 PERCENT ABORTIVE ☐ 3 ☐ 5 GMS. PER 1000 SEEDS

## 11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- ☐ 0 SEPTORIA ☐ 2 NET BLOTCH ☐ 2 SPOT BLOTCH ☐ 0 POWDERY MILDEW
- ☐ 0 LOOSE SMUT ☐ 0 BACTERIAL BLIGHT ☐ 0 COVERED SMUT ☐ 0 FALSE LOOSE SMUT
- ☐ 0 STEM RUST ☐ 0 LEAF RUST ☐ 0 SCAB ☐ 1 SCALD
- ☐ 0 AY ☐ 0 BSMV ☐ 0 BYDV ☐ 0 OTHER (Specify)

## 12. INSECT: (0 = Not tested, 1 = Susceptible, 2 = Resistant)

- ☐ 0 GREEN BUG ☐ 0 ENGLISH GRAIN APHID ☐ 0 CHINCH BUG ☐ 0 ARMYWORM
- ☐ 0 GRASS HOPPERS ☐ 0 CEREAL LEAF BEETLE ☐ 0 OTHER (Specify)
- HESSIAN FLY RACES ☐ 0 GP ☐ 0 A ☐ 0 B ☐ 0 C  
☐ 0 D ☐ 0 E ☐ 0 F ☐ 0 G

## 13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- ☐ 0 DDT ☐ 0 OTHER (Specify)

## 14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	B1215	Seed size	B1215
Leaf size	B1215	Coleoptile elongation	B1215
Leaf color	B1215	Seedling pigmentation	B1215
Leaf carriage	B1215		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

- Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Canada in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
- Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
- Malting Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

## EXHIBIT D

**BOTANICAL DESCRIPTION OF ~~2B89-4311~~ 'B4311'***per letter  
4/16/96*

2B89-4311 Is a two-rowed, mid-maturing spring barley bred and developed by Busch Agricultural Resources, Incorporated Ft. Collins, Colorado. It has excellent malting quality.

Juvenile growth habit is erect. Plant color at boot is green with an upright and slightly curled flag leaf. Head shape is parallel and mid-lax in density with a nodding head type. Neck is straight with a saucer or cup collar. First rachis segment is short and wide or long and narrow. Base of the first segment is a margin flange with hairs on the margin. Rachis shape is plain with long hairs covering the edge. Glume length is one half the length of the kernel and the glume hair is long and confined to a band. The glume awns are rough and equal to the length of the glume. Lemma awns are longer than the spike and rough. Lemma teeth are frequent and sharkskin is present. Lemma hair is absent and the base is a depression. Lateral floret formation is convergent with rounded lemma tips. Seed is covered, mid-long to long, finely wrinkled with wax present and the aleurone is colorless. Palea tips are V-shaped. Rachilla length is one-half the length of the kernel with few long hairs thicker at the base. Ventral crease is V-shaped and lacks crease hair. Fence hair is present.

2B89-4311 is an Intermountain two-rowed variety well adapted to Montana, Idaho and Wyoming.



EXHIBIT H

AGRONOMIC AND QUALITY DATA

SEE ATTACHED PAGE

**2B89-4311****1995 WESTERN TWO-ROWED A.M.B.A. TESTING CANDIDATE****AGRONOMIC SUMMARY**

LINE OR VARIETY	YIELD (% B1202)						(35)	(29)	(15)	(27)	(21)	(6)	
	(4)	(3)	(3)	(12)	(12)	(34)	HEAD	HT	LDG	MAT	TEST	(10)	NET
	PRE-92	92	93	94	95	AVE	1/1	CM	1-9	1-5	WT	SCALD	BLOTCH
2B89-4311 'B4311'	98	98	102	100	93	97	179	89	2.0	4.2	53.2	23.3	6.0
B1202	100	100	100	100	100	100	178	87	2.3	3.9	52.1	13.6	3.0
	(125) *	(121)	(102)	(123)	(115)	(119)							
HARRINGTON	94	105	104	98	97	98	179	88	3.0	4.0	53.0	11.5	3.2

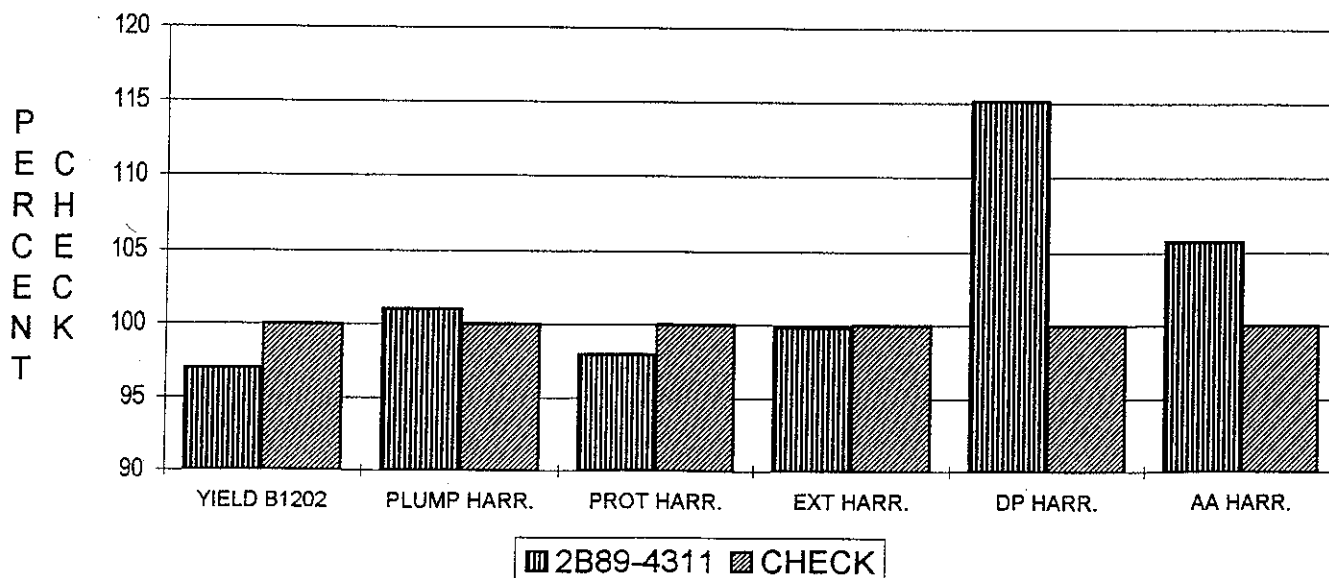
1989-95 DATA, ( ) = STATION YEARS

\* BUSHEL / ACRE

**QUALITY SUMMARY**

LINE OR VARIETY	EXTRACT						WORT					
	(25)	(27)	(16)	(27)	(16)	(16)	(27)	(27)	(27)	(27)	(2)	(27)
	%	MALT	F.	C.	F-C	WORT	(27)	SOL	(27)	(27)	(2)	(27)
	PLUMP	PROT	GRD	GRD	DIF	VIS	S/T	PROT	DP	AA	CLR	TUR
2B89-4311	89.2	10.9	80.1	79.3	0.81	1.45	48.7	5.3	143	72.4	1.9	6.3
HARRINGTON	88.3	11.2	80.3	78.9	1.40	1.48	48.1	5.5	124	68.5	2.1	6.7

1989-95 DATA, ( ) = STATION YEARS

**2B89-4311**

## EXHIBIT E.

## STATEMENT OF THE BASIS OF APPLICANT'S OWNERSHIP

Busch Agricultural Resources, Incorporated is applicant for protection in this case being:

- per letter  
4/16/96 MAH*
- a). The incorporated business registered in Delaware for and within which regular employees have bred ~~2B89-4311~~ 'B4311'
  - b). The proprietary owner and intending commercial seller of 2B89-4311.

## AMENDMENT TO EXHIBIT E

PV Application No. 9600081, BARLEY, ~~2B89-4311~~ 'B4311'*per letter  
4/16/96  
matt*

2B89-4311 is a two-rowed spring barley for which Plant Variety Protection is hereby sought was developed by Dr. Mike Bjarko, an employee of Busch Agricultural Resources, Incorporated. By agreement between employees and Busch Agricultural Resources, Incorporated: all rights to any invention, discovery, or development made by the employee while employed by Busch Agricultural Resources, Incorporated, were assigned to Busch Agricultural Resources, Incorporated, with no rights of any kind pertaining to 2B89-4311 being retained by the employee.